# METHOD AND COMPUTER SYSTEM FOR SCHEDULE BIDDING

## BACKGROUND OF THE INVENTION

### Technical Field

The invention relates generally to computer-
implemented agent or employee scheduling in a work center
environment.

### Description of the Related Art

Typically, scheduling workers is a manual process that
is time-consuming for both employees and supervisors.
Supervisors print up and make available different schedules
to workers, such as day, evening or night shift, and a
particular schedule typically includes various attributes,
such as different lunch and break times available.  For
example, a day shift schedule, starting at 8 am and ending
at 4 pm, might have a number of possible lunch times
starting at 11:00 am, 11:30 am, 12:00 noon, 12:30 pm, and
1:00 pm. Of course, the problem is exacerbated because
employees have their own preferences, such as which shift
they want to work, how well the shift suits their
lifestyle, and when they want to have their lunch and other
breaks.  Scheduling employees for such varied work shifts
is extremely time consuming and ad hoc.  In a common
scenario, schedules are posted on the wall of a
supervisor's office or conference room and employees are
then scheduled manually to come into the room in seniority
or rank order and sign their name by the schedule they
want.  In another common scenario, employees rank the
available schedules based on their preferences and submit
bids to the supervisor.  The supervisor then sorts through
the submitted bids from employees in seniority or rank

order and manually assigns each employee a schedule, based on the employee's rankings of the schedules.

These manual processes (including, among other things, printing schedules, employee bidding, and then assigning 5 employees to schedules) are very time consuming for both employees and their supervisor.

Thus, there remains a need for an improved method of schedule bidding and schedule assignment.

## BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to enable entities in a work environment to view and bid for schedules online.

5     It is another object of the invention to provide a method and computer system for schedule bidding that eliminates manual schedule distribution and data entry from paper sign-up sheets.

It is another more specific object of the invention to
10   provide techniques whereby agents in a contact center work environment use a Web browser-based schedule bid display to view sets of schedules and then rank their schedule preferences. Preferably, after a bidding cycle is closed, bids are automatically processed in seniority or other
15   ranking order.

It is a further object of the invention to provide a method and computer system to enable a supervisor to specify which schedules are available for bidding, which data items (e.g., lunch times, number of slots, and the
20   like) are available to be seen by the agents who will be bidding, and the date range for which the schedules will be available for bidding. More generally, the supervisor (or other management entity) can enter special instructions and specify what is displayed to agents in a schedule bid
25   display screen. As a result, agents only see the schedules for a particular group. After an agent has bid on a schedule, he or she can then view it or modify his or her bid.

It is another object of the invention to provide a
30   schedule bidding system wherein employees are allowed to

see and bid on schedules for which a supervisor has given
them permissions. Once a bid is closed, a supervisor may
initiate a process that assigns employees to schedules,
e.g., based on a specified employee ranking method and each
5    employee's bids.

It is another more general object of the invention to
enable entities (e.g., agents, employees, and the like) in
a work environment such as a contact center to view and
submit bids for schedules using a Web browser, rather than
10   paper. Using the system, employees can sort schedules
according to whatever criteria is most important to them,
which makes bidding more efficient and satisfying. An
auto-rank feature preferably automatically ranks the
schedules in a current order, which saves time. Once
15   employees have bid, an assignment process executed by a
supervisor eliminates time-consuming manual assignments.

In a representative embodiment, the present invention
provides a method and computer system for assigning one or
more schedules to a plurality of employees. Schedules are
20   posted online and can be viewed, and bid upon, by
employees. Employees preferably enter their individual
schedule sort preferences. Schedules preferably are sorted
in order of priority, based on the employee's preferences.
Employees then bid on the schedules. The bidding for each
25   set of schedules is then closed at a given time. The
supervisor then initiates a process that sorts the
employees in a specified order and assigns a schedule to
each of the employees, preferably based on their bids.

The foregoing has outlined some of the more pertinent
30   features of the invention. These features should be
construed to be merely illustrative. Many other beneficial

results can be attained by applying the disclosed invention in a different manner or by modifying the invention as will be described.

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## BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is an illustrative bidding home display screen according to an embodiment of the present invention;

FIGURE 2 is an illustrative bid sort display;

FIGURE 3 is an illustrative bid display;

FIGURE 4 is an illustrative select schedule pattern set display;

FIGURE 5A is an illustrative select agents display screen;

FIGURE 5B is an illustrative portion of an Agent select table of FIGURE 5A with all fields shown;

FIGURE 6 is an illustrative finish assigning agents display screen according to the present invention; and

FIGURE 7 is a block diagram of an agent supervisor computer network in which the present invention may be implemented.

## DETAILED DESCRIPTION OF AN EMBODIMENT

In the following discussion, the invention is described in the context of a contact center environment, although it should be understood that the invention can be
5    practiced in other types of environments such as, without limitation, sales force environments, field service environments, manufacturing environments, and other types of environments wherein entities (agents, employees, contractors, other persons, etc.) work according to
10   assigned schedules. In a contact center, the environment generally comprises an automatic call distributor (ACD) and a multimedia server coupled to a host computer via a computer network. The ACD and multimedia server generally provide routing capabilities for incoming voice calls (via
15   the ACD) and other contacts (via the multimedia server), such as faxes, email, voice mail, web requests, web call-back requests, web chats, web voice calls, web video calls, and the like. For ease of discussion, the persons who work at the contact center are referred to herein variously
20   as "agents" or "employees." These designations are used interchangeably within the following description. Of course, this nomenclature is not meant to be taken to limit the invention in any way, as the word "employee" or the word "agent" is meant to be broadly construed to include
25   any person regardless of a particular legal status. An entity need not actually handle contacts, of course. A "schedule" is any ordered list of times at which given events or activities are planned to occur. Of course, as noted above, the present invention may be implemented in
30   any work environment where entities desire to bid on work

or other task schedules.

As seen in Figure 7, a distributed computing environment in which the schedule trading method and system of the invention may be implemented includes a set of
5   computing-related entities (systems, machines, processes, programs, libraries, functions, or the like) that facilitate or provide an agent-supervisor network. In a typical implementation, the environment typically comprises a set of computers. A representative machine is a client
10  workstation or a network-based server running commodity (e.g. Pentium-class) hardware, an operating system (e.g., Linux, Windows 2000, OS-X, or the like), an application runtime environment (e.g., Java), and a set of applications or processes (e.g., Java applets or servlets, linkable
15  libraries, native code, or the like, depending on platform) that provide the functionality of a given system or subsystem. A client machine typically includes a Web browser (Internet Explorer, Netscape Navigator, Apple Safari, or the like) or other rendering engine. A Web
20  browser typically includes or supports media players and other plug-ins. The present invention implements a distributed platform that enables employees to view and bid for work schedules over a network including, without limitation, the publicly-routable Internet, a corporate
25  intranet, a private network, or any combination thereof. The method may be implemented as a standalone product, or as a managed service offering. Moreover, the method may be implemented at a single site, or across a set of locations.

It is further noted that, unless indicated otherwise,
30  all functions described herein may be performed in either hardware or software, or any combination thereof. In a

preferred embodiment, the functions are performed by one or more processors executing given software.

In illustrative agent-supervisor network 700, a central database 702 is used to store data comprising

5   schedules. The schedules may be accessed and modified. As will be described, the schedules are accessed and modified by one or more machines, such as a supervisor machine 704, entity A 706, entity B 708, entity C 710 and entity D 712. In this example, only four entities are shown, but in a

10   typical implementation, there will be many more depending on the number of entities at a specific location, or across a set of locations.

As noted above, the agent-supervisor network 700 may be implemented in a number of ways, including client-

15   server, distributed computing architecture and so on. Supervisor 704 and entity A 706, entity B 708, entity C 710, entity D 712 typically access database 702 using a Web browser or other user interface.

The supervisor 704 (which as used herein and depending

20   on context refers to a person or entity, or a machine, program or process operated by such a person or entity) preferably determines when bidding on schedules is open and when it is closed. When bidding is open, preferably some or all of the entities 706, 708, 710 and 712 use a bidding

25   home display (FIGURE 1), a bid sort display (FIGURE 2) and a bid screen (FIGURE 3) to view schedules, define their schedule sort preferences (as will be defined below), sort schedules based on those preferences, and then attempt to bid on those schedules that match their preferences. As

30   will be explained below, some agents, depending on their seniority, typically will end up having to bid on all

schedules, since they are not likely to get their preferred schedule. According to the invention, agents bid on schedule patterns (which may be called schedules), and schedule patterns are typically grouped in a schedule

5 pattern set. The displays in FIGURES 1-3 are merely illustrative of the inventive functionality and are not to be taken to limit the techniques to these particular user interfaces. Table 1 summarizes representative agent or employee entity displays and their function.

10 TABLE 1

| Agent display | Bidding home display | Bid sort display | Bid display |
|---|---|---|---|
| Function | Select a schedule pattern set for bidding | Define preferences for sorting | View sorted schedules and bid on them |

Once bidding is closed, preferably supervisor 704 uses a select schedule pattern set display (FIGURE 4), a select agents display (FIGURE 5), and a finish assigning agents

15 screen (FIGURE 6) to select a schedule set, select agents and assign agents to schedules. The displays in FIGURES 4-6 are also merely illustrative of the inventive functionality and are not to be taken to limit the disclosed techniques to these particular user interfaces.

20 Table 2 summarizes the representative supervisor entity displays and their function.

TABLE 2

| Supervisor display | Select schedule pattern set | Select agents | Finish assigning agents |
|---|---|---|---|
| Function | Select | Select agents | Assign agents |

| | schedule pattern set | | to schedules |
|---|---|---|---|

In a particular embodiment, a particular agent operates a computer that is connectable to at least one server, with the server connectable to a computer network.

5 In a preferred embodiment, the server provides a site or a set of pages (accessible, for example, via the public Internet, via an intranet, as an extranet application, or the like) within which given entities (e.g., agents) may view and bid on schedules. The server comprises at least

10 one processor, a database of schedule information, and code executable on the server to facilitate the above-described functionality. As used herein, a "server" may refer to a given machine, or a set of machines or processes, whether centrally-located or distributed. The server also includes

15 code for generating the agent displays (FIGURES 1-3) and for exporting views of those displays to client computers associated with the agents. Likewise, the server includes code for generating the supervisor displays (FIGURES 4-6) and for exporting views of those displays to client

20 computers associated with the supervisor(s). One of ordinary skill in the art will also appreciate that other display navigation techniques may be used in lieu of or in addition to the display screens and tools shown in FIGURES 1-6.

25 Referring to FIGURE 1 of the drawings, the reference numeral 100 generally designates a bidding home display that may be used by an entity (an agent, an employee, or the like) that desires to use the functionality.

As noted above, generally speaking, a daily schedule

refers to specific time related events in an employee's daily work routine.  A schedule, sometimes referred to herein as a schedule pattern, is a set of daily schedules that the employee works for a specific number of days.  At

5   a minimum, preferably a daily schedule contains information about start and end times, that is, when the employee is expected to come to work and when the employee is expected to finish work.  Of course, a daily schedule may have additional time-related information, such as meal break

10  times, coffee break times, as well as any other specific tasks or events employees are scheduled to perform or are otherwise associated with during a work day.  Typically, an employee is usually assigned a specific schedule for at least a week and often for several months.

15      As used herein, a schedule set, also sometimes called a schedule pattern set, refers to a set of schedule patterns, usually for one contact center location, that is designed to allow a set of employees working that set of schedule patterns to adequately staff the location for the

20  hours required to meet the location's goals.  For example, if a location must provide 24/7 (24 hours a day, seven days a week) availability, the schedule pattern set assigns employees schedules in such a way that employees are available for the required hours.

25      On the bidding home display 100, preferably an agent selects a set of schedule patterns to bid upon from a pattern table 102.  Preferably, pattern table 102 is comprised of one or more entries.  A pattern table entry 104 comprises a schedule pattern set name field 106, an

30  open dates for bidding field 108, and an already bid field 110.  In this example, which is merely representative,

there are three entries: full-time schedules 112, part-time schedules 114 and overtime schedules 116. On the bidding home display screen 100, preferably each agent only sees the sets of schedule patterns that a supervisor allows them

5    to view and bid on. Thus, in an illustrative embodiment, a supervisor assigns each agent a permission level such that the agent may view and bid on only those schedule patterns the supervisor feels are appropriate for that agent. Typically, an attribute of the agent, such as whether the

10   agent is full-time or part-time, or whether the agent is bilingual or not, is used as the basis for determining the schedule patterns that the agent may view and bid on. For example, full-time agents might only be allowed to bid on full-time schedules, so part-time schedules 114 may not be

15   visible or they may be obscured so that such schedules cannot be selected by full-time agents. Similarly, part-time agents might only be allowed only to view and bid on part-time schedules, and agents with a certain level of seniority might be the only ones allowed to view and bid on

20   overtime schedules. Of course, the above examples are merely illustrative and should not be taken to limit the scope of the present invention in any way.

Preferably, each set of schedules also has a corresponding bidding time period associated with it during

25   which the agent may use bid home display 100 to bid on schedules. Preferably, new bids automatically override any previous bids placed by the agent during the bidding time period for a set of schedules. Once the bidding time period is over, bidding is said to be closed and preferably

30   no further bids may be placed for that set of schedules. Once a schedule pattern 106 is selected, preferably the

agent is taken to the next display screen illustrated in FIGURE 2.

Now referring to FIGURE 2, the reference numeral 200 generally designates an illustrative example of a bid sort

5    display screen. On the bid sort display screen 200, the agent may determine or specify which factors associated with a schedule are most important to the agent. This enables the schedules available for bidding to be sorted based on each agent's preferences.

10   As noted above, because the supervisor may determine which factors may be viewed, the number of factors available for sorting by an agent may vary depending on what the supervisor has determined are available. In the illustrative example of FIGURE 2, which is not meant to be

15   taken as limiting, the agent is allowed to sort by four (4) different factors.

In particular, bid sort display screen 200 comprises a first portion 202 (for sorting) and a second portion (for day off preferences) 204. The first portion 202 in this

20   illustrative example comprises four sort fields, fields 206, 208, 210 and 212, each of which has a corresponding sort order listbox, 214, 216, 218, and 220. The second portion of the display (the Day off preferences) 204 comprises seven fields corresponding to the days of the

25   week: Sunday 222, Monday 224, Tuesday 226, Wednesday 228, Thursday 230, Friday 232, and Saturday 234.

The values available in the illustrative four sort fields 206, 208, 210 and 212 preferably depend on what the supervisor has determined may be viewed by the agent. Some

30   examples of the values which sort fields 206, 208, 210 and 212 may have include: a pattern identifier number, team

information, such as the supervisor's name, or skills required for that team, such as bilingual language skills, pattern type such as whether it is full-time, part-time or overtime, number of days off, start time for each day of

5   the week, end time for each day of the week, total hours, paid hours, break start for each day of the week, break end for each day of the week, break length for each day of the week, total slots available, assigned slots, available slots, day off preferences, and the like. Of course, these

10  are merely illustrative examples and are not meant to limit the present invention.

As illustrated, the sort order fields 214, 216, 218, and 220 may have the value of ascending or descending, and a listbox or other visual tool may be used to alter the

15  setting.

If one of sort fields 206, 208, 210, or 212 has a value "day off preferences," (as does sort field 208 in this example), then the agent is allowed to rank day off preferences, e.g., by putting a value from 1 to 7 in a "day

20  off prefs" field, namely, one of the fields: Sunday 222, Monday 224, Tuesday 226, Wednesday 228, Thursday 230, Friday 232, and Saturday 234. Preferably, duplicate values may be assigned to two or more "day off preferences" in the day fields 222, 224, 226, 228, 230, 232 and 234 if the

25  agent ranks them equally. Thus, for example, if the agent prefers having a Saturday or Sunday off, the agent might select "day off preferences" in one of the sort fields 206, 208, 210 or 212 and then put a value of 1 in the Sunday and Saturday fields 222 and 234, and a value from 2 to 7 in the

30  Monday, Tuesday, Wednesday, Thursday and Friday fields 224, 226, 228, and 230.

The sort fields 206, 208, 210 and 212, and the sort orders 214, 216, 218 and 220, along with the day off preferences fields 222, 224, 226, 228, 230 and 232 work together to sort all the schedules available for bidding
5    based on the agent's preferences. Of course, the disclosed number of fields is merely representative. Thus, for example, if the work environment does not schedule agents or employees on weekends, the Saturday and Sunday fields can be omitted or otherwise disabled.

10    In a representative embodiment, sort field 206, using its associated sort order 214, orders the schedules available for bidding to the agent. For schedules with the same value in sort field 206, sort field 208 and associated sort order 216 are used to sort the resulting subset of
15    schedules. For schedules with the same value in sort field 208, sort field 210 and its associated sort order 218 are used to sort the resulting subset of schedules. For schedules with the same value in sort field 210, sort field 212 and its associated sort order 220 are used to sort the
20    resulting subset of schedules. If one of sort orders 206, 208, 210 or 212 have the value "Day off preferences," then the "day off preferences" portion of the display, namely, the values in fields: Sunday 222, Monday 224, Tuesday 226, Wednesday 228, Thursday 230, Friday 232, and Saturday 234
25    are sorted in the selected ascending or descending sort order, depending on the value of their corresponding sort order.

For example, suppose an agent prefers to have (a) Monday and Tuesday off, (b) maximum total hours, (c) a
30    Wednesday break as early as possible and (d) a given supervisor Mike Jones. The agent can attempt to obtain a

schedule with these attributes by using the display shown in Figure 2 in the following representative manner: agent sets sort field 206 to "Day off preferences," sort order 214 to ascending, sets day off preferences Monday 224 and
5    Tuesday 226 to 1, sets Sunday 222, Wednesday 228, Thursday 230, Friday 232 and Saturday 234 to a value from 2 to 7, sets sort field 208 to "total hours," sets sort order 216 to descending, sets sort field 210 to "break start – Wednesday," sets sort field 218 to ascending, sets sort
10   field 212 to "supervisor," and sets sort order 220 to descending.

Typically, any of the sort fields 206, 208, 210 and 212, sort order fields 214, 216, 218, and 220, and day off preference fields 222, 224, 226, 228, 230 and 232 may be
15   implemented using pull-down menus, free form text fields that look up the text input in a table, fill-in forms, radio buttons, or any other convenient graphical user interface widget or control.

Once the agent has defined preferences in bid sort
20   screen 200, preferably the agent is then taken to a next display screen where the schedules available for bidding are sorted based on the preferences input by the agent.

Now referring to FIGURE 3, the reference numeral 300 generally designates an illustrative bid display screen.
25        On bid display screen 300, the agent may view a schedule table 302 preferably comprised of one or more entries. A schedule table entry 304 comprises one or more fields, including (for example): a bid field 306, a schedule pattern ID field 308, a team field 310, a pattern
30   type field 312, a slots field 314, a days of the week field 316, a schedule (or "shift") start field 318, a schedule

end field 320, a break start field 322 and a break end field 324. ID field 308 preferably has an identifier number for a specific schedule. For example, a schedule with shifts from Monday through Friday, starting at 9:00 am

5   and finishing at 5:00 pm, preferably will have a different identifier in ID field 308 than, for example, a schedule with shifts from Monday through Friday, starting at 12:00 noon and finishing at 9:00 pm.

Team field 310 preferably is a supervisor defined

10  field and may be used to indicate information about the team such as the supervisor's name, the skills required to work in that team, such as bilingual language skills, and the like.

The pattern type field 312 preferably is a supervisor-

15  defined field and indicates a type of pattern, such as full-time, part-time, or overtime.

The slots field 314 preferably indicates a number of slots available for bidding on. For example, one schedule may have ten slots available for bidding while another

20  schedule may only have five slots. As used herein, a slot is the number of agents who can be assigned to a particular schedule pattern.

The days of the week field 316, schedule start field 318 and shift end field 320 combine together to show a

25  schedule start and a schedule end time for each day of the week for the particular schedule. As illustrated in FIGURE 3, each row of the table (which may represent a record in a database) is a daily schedule pattern. Reference numerals 326, 328 and 330 each represent weekly schedule patterns.

30  The weekly schedule pattern 326 has two(2) daily schedules associated therewith. Weekly schedule pattern 328 has four

(4) daily schedules associated therewith, and weekly schedule pattern 330 has one (1) daily schedule pattern associated therewith. These are merely illustrative.

More specifically, schedule record 330 corresponds to a schedule on Monday, Tuesday, Wednesday, Thursday and Friday that starts at 8:00 am and ends at 5:00pm.

The group of schedule records identified by reference number 326 correspond to the following schedules: Monday, Wednesday and Friday that start at 8:00 am and end at 5:00pm, and schedules on Tuesday and Thursday that start at 9:00 am and end at 6:00 pm. The group of schedule records 328 correspond to the following schedules: Monday and Friday schedules that start at 8:00 am and end at 5:00 pm, a Tuesday schedule that starts at 9:00 am and ends at 6:00 pm, a Wednesday schedule that starts at 8:30 am and ends at 5:30 pm, and a Thursday schedule that starts at 9:30 am and ends at 6:30 pm.

It should be noted that in this example the schedule start 318 and schedule end 320 are shown. However, in a variation, the start time and the length of the schedule may be shown. In still another variation, only the start time may be shown, if all schedules are already known to be of a fixed length, such as nine hours.

Break start field 322 and break end field 324 indicate when a break, such as a lunch or dinner break, is scheduled. In another implementation, only the break start may be shown, e.g., if all breaks are already known to be of a fixed length, such as one hour.

The supervisor may set the fields that are shown for each set of schedules available for bidding. Thus, the supervisor may determine which schedules are shown, as well

as the amount of information displayed for each schedule, such as when the shift starts, when the break starts, how many slots are available, and the like.

As previously mentioned, preferably the schedules

5    shown on bid display screen 300 are sorted based on the agent's preferences entered on bid sort screen 200. Then, on bid display screen 300, the agent may rank schedules automatically or manually. To automatically rank the schedules, the agent may select an auto-rank control 330,

10   which (upon selection) ranks the schedules in the order they appear on bid display screen 300, i.e. sorted based on the preferences originally input by the agent. Selecting the auto-rank function 330 preferably results in bid field 306 of schedule record 304 being filled in for each

15   schedule entry in the table.

Alternately, the agent may rank schedules manually by entering a value in bid field 306, e.g., a unique number from 1 to 9999. Thus, if an agent is ranking 10 schedules, he or she may enter the numbers 1 through 10, in each bid

20   field 306 of the 10 records the agent wishes to rank, with (for example) 1 indicating the highest priority bid and 10 indicating the lowest priority bid.

Once the schedules are ranked, either automatically (by using the auto-rank button 330) or manually (by

25   entering a unique number in bid field 306 for each schedule record the agent wishes to rank), the agent enters the selection, e.g., by using a submit button 332 (or other convenient user selection) to submit the agent's bids.

As previously mentioned, the agent may go back to the

30   bid home display screen 100 to select a set of schedules, enter new sorting preferences in bid sort display screen

200, and again bid on schedules using bid display 300,
until bidding is closed. Of course, other agents are using
these displays for the same purposes themselves. The
system collects the data entered by the agents. Once

5    bidding is closed, the supervisor can then proceed to
assign schedules to agents. This process is now described.

Although not meant to be limiting, typically a
schedule is assigned to an agent for an extended period,
such as a calendar quarter (three months), two calendar

10   quarters (six months), and the like. Near the end of each
previously assigned scheduling period, the supervisor
typically posts online a new set of schedules for bidding
online, agents enter bids for the new schedules online (as
has been described above), and new schedules are assigned

15   to agents for the next extended time period.

Now referring to FIGURE 4, the reference numeral 400
generally designates a representative select schedule
pattern set display.

In particular, once agent bidding is closed, the

20   supervisor preferably begins the schedule assignment
process at the select schedule pattern set display 400,
which preferably comprises a management unit selector
portion 402, a schedule pattern set selector portion 404, a
force assignments checkbox 406, and a navigation control

25   portion (e.g., a control box) 408. A "management unit"
preferably is a set of one or more employees at a given
level that are managed or manageable by a given entity
(e.g., a supervisor) collectively. The present invention
is not limited to schedule bidding in the context of

30   management units, of course. Management unit selector
portion 402 preferably comprises a management unit number

410 and a management unit name field 412. This portion of
the display may be omitted if management units are not
used. Navigation box 408 preferably comprises a help button
414, a next button 416, and a cancel button 418.

5      In an illustrative embodiment, the supervisor or other
management entity typically enters a number of the
management unit in management unit number field 410, and
the name of the management unit is found in a table and
displayed in management unit name 412. The associated

10    schedule pattern sets available for that management unit
are then displayed in schedule pattern set field 404. As
noted above, the management unit is usually a group of
agents at the site (location) for which schedules are being
assigned by the supervisor. Typically, the schedule

15    pattern set is a group of similar schedule patterns, such
as full-time schedule patterns for an extended time period
(such as a calendar quarter).

      Pull-down menus, free-form text fields that look up
values in a table, or other well known methods, may be used

20    for selecting the management unit number 410, management
unit name 412 and schedule pattern set 404.

      The supervisor may force assignments for selected
agents, if desired, by checking the force assignments
checkbox 406. Typically, this forcing function is used

25    towards the end of the assignment process and will be
discussed in more detail below.

      The supervisor may select help button 414 to display a
page with information on how to complete the select
schedule pattern set display 400. The supervisor may

30    select cancel button 418 to cancel any selections made and
return to a supervisor home page; alternatively the cancel

button may just close the window. Once the supervisor has selected a schedule pattern set 404 in a management unit number 410 and (if necessary) has checked force assignments checkbox 406, the supervisor may select a next button 416

5 to proceed to the next display screen.

Now referring to FIGURE 5A, the reference numeral 500 generally designates an illustrative select agents display page.

Select agents page 500 may include a Sort by field

10 502, a Then by field 504, a Find value field 506, an Agent select table 508, an Assign agent table 510, a Sort button 518, a Find next button 520, a Select button 522, a Select All button 524, a Deselect button 526, and Deselect All button 528.

15 The Sort by field 502, the Then by field 504, and the Sort button 518 comprise a set of sorting functions 512. The Find value field 506 and the Find next button 520 comprise a set of finding functions 513. The Select button 522, the Select All button 524, the Deselect button 526,

20 and the Deselect All button 528 comprise a set of selecting functions 514. Navigation functions 516 preferably comprise Help button 530, Back button 532, Next button 534 and Cancel button 536.

Agent select table 508 and Agent assign table 510

25 preferably comprise one or more data records, with each data record 538 (see FIGURE 5B) preferably containing information on agents who may be available to work a schedule. As seen in FIGURE 5B, which is an Agent select table 508 shown in a full display format, a given data

30 record comprises a bid indicator field 540, an agent ID field 542, an agent Name field 544, a Supervisor field 546,

a Seniority Date field 548, a Seniority Extension field 550 and a Rank field 552.

As noted above, in the select schedule pattern set display 400, the supervisor selects the management unit 402
5    and the schedule pattern set 404 before selecting next button 416 to get to select agents page 500. Thus, the schedule pattern set has already been selected and the supervisor may now choose agents that are to be assigned to schedules using the select agents page 500.

10    Agent select table 508 preferably shows the records for agents who may be selected to be assigned to schedules, while Agents assigned table 510 shows the records for all agents who will be assigned to schedules in the schedule pattern set. Typically, when the supervisor starts, Agents
15    assigned table 510 will be empty. Alternatively, table 510 may be pre-populated with given information.

Typically, the supervisor sorts by specific fields in table 510, for example, by (i) setting a value in Sort by field 502, (ii) setting a value in Then by field 504, and
20    then (iii) using the Sort button 518. Both the Sort by field 502 and the Then by field 504 may have one or more values such as: bid flag, agent ID, agent name, and a user-definable column, such as supervisor, seniority date, seniority extension, rank and none. Sort by field 502 and
25    Then by field 504 may be implemented using any convenient interface method such as pull-down menus, free form text fields with a table lookup, radio buttons, or the like.

The supervisor may enter text, such as an agent name, in the Find value field 506 and then use the Find next
30    button 520 to find (in agent select table 508) a next occurrence of the text entered in the Find value 506.

Again referring to FIGURE 5B, preferably each record 538 has the agent's name 544 and agent ID 542. Bid field 540 indicates whether the agent bid on the selected schedule pattern set or not. Supervisor field 546 has the

5 name of the agent's supervisor. Seniority date field 548 preferably contains the date used to determine the agent's seniority, such as the agent's start date with the company. A seniority extension field 550 may also be available and is useful as a tiebreaker. Thus, if seniority ranking is

10 used and two or more agents have the same amount of seniority, i.e. their seniority date is the same, then the seniority extension may be used as a tie-breaker to determine the order in which the two agents will be processed.

15 Rank field 552 indicates a number related to the employee, for example, for purposes of aiding the supervisor in ranking employees. For example, rank field 552 might be a numerical value representing the agent's performance, the agent's seniority, a combination of

20 performance and seniority, or any other supervisor-selected metric.

Typically, when assigning agents to schedules, agents are ordered based on their seniority, using seniority date field 548, or based on their performance ranking, using

25 rank field 552. Thus, if seniority ranking is used, then the agent with the most seniority will be processed first, and the agent with the lowest seniority will be processed last. Similarly, if performance ranking is used, the agent with the highest performance ranking will be processed

30 first and the agent with the lowest performance ranking will be processed last. These are merely illustrative

approaches, however.

The supervisor may select and transfer records between agent select table 508 and agent assign table 510 using selection buttons 514. All records in Agent select table

5   508 may be selected using the Select All button 524, or the supervisor may individually select one or more records in Agent select table 508. The selected record(s) may then be transferred from Agent select table 508 to Agent assign table 510 using Select button 522. All records in Agent

10  assign table 510 may be deselected using Deselect All button 528, or the supervisor may individually select one or more records in Agent assign table 510. The records selected in Assign agent table 510 may then be transferred back to Agent select table 508 using Deselect button 526.

15  The agent records that will remain in Agent select table 508 typically include records for the agents who did not bid on the schedule. For example, agents whose schedule assignment is not changing, or agents who are to be assigned to a schedule in a different schedule pattern set,

20  may be left in the Agent select table 508. Of course, this example is not meant to be taken to limit the present invention in any way.

As noted above, the supervisor may select Help button 530 to display a page with information on how to use the

25  Select agents page 500. The supervisor may select Back button 532 to return to the previous display screen and select a different schedule pattern set. The supervisor may select Cancel button 536 to cancel any selections made and return to the supervisor home page; alternatively the

30  cancel button may just close the window.

Once Assign agents table 510 contains the records for

all the agents that the supervisor wishes to assign to schedules in the selected schedule pattern set, the supervisor may use the Next button 534 to proceed to the next display screen.

5       Now referring to FIGURE 6, the reference numeral 600 generally designates an illustrative finish assigning agents display screen.

Finish assigning agents display 600 preferably comprises a status field 602, a management unit MU field

10      604, a schedule pattern set field 606, a force assignment field 608, a confirmation field 610, a warning field 612 and one or more navigation buttons 614.  Navigation buttons 614 preferably comprise a Help button 616, a Back button 618, a Finish button 620 and a Cancel button 622.

15      In finish assigning agents page 600, the supervisor preferably receives confirmation regarding the schedule pattern set assigned to one or more agents using the select agents display screen 500 of FIGURE 5A.  Status 602 indicates that the supervisor will finish assigning the

20      selected agents to the selected schedule pattern set 606, preferably by using Finish button 620.

The MU field 604 preferably indicates the management unit number and name.  As noted above, typically this refers to a unique management unit number and name

25      identifying a group of agents at a location where agents are employed.  In this example, the management unit name is Birmingham Sales.  The Schedule pattern set field 606 preferably indicates which schedule pattern set has been selected for assigning agents.  In this example, the full-

30      time (FT) and part-time (PT) schedules for the third quarter, for all teams, have been selected.  Of course,

this is merely representative.

The Force assignment field 608 indicates whether force assignments checkbox 406 was selected in select schedule pattern display screen 400. The Confirmation field 610

5 indicates the number of agents that the supervisor selected for assigning to schedules in the select agents display 500. The Warning field 612 indicates that if any of the selected agents were previously assigned patterns in this schedule pattern set, those assignments will be lost, e.g.,

10 once the supervisor uses the Finish button 620.

The supervisor may select Help button 616 to display a page with information on how to use the finish assigning agents display 600. The supervisor may select Back button 618 to return to the previous display screen. The

15 supervisor may select Cancel button 622 to cancel any selections made and return to the supervisor home page; alternatively the cancel button may just close the window.

Once the supervisor has completed reviewing the information on finish assigning agents display page 600,

20 the supervisor may use Finish button 620 to complete the assignment of the agents in 610 to the schedule pattern set in 606 with respect to the identified management unit MU 604.

The selected agents are then each assigned a schedule.

25 As noted above, preferably agents are processed in either seniority order or rank order, depending on the method specified for the management unit. Preferably, an agent is assigned to his or her highest-ranked schedule, if the schedule is available. If all of the schedule's slots have

30 been assigned to other agents, then the agent preferably is assigned to his or her next highest-ranked schedule, if

that schedule is available, and so on.   If none of the
schedules that an agent bid on are available, or if the
agent did not enter bids for any schedules, then the agent
is not assigned a schedule, perhaps unless the force
5    assignments checkbox 406 has been selected.   If the force
assignments box 406 has been selected, once all of the
agents have been processed, schedules may be assigned to
agents that remain unassigned.   Preferably, an agent will
only be assigned to a schedule that he or she was allowed
10   to bid on, e.g., based on his or her assigned permissions
and attributes.

The schedule bidding feature of the present invention
provides numerous advantages.   It allows entities being
scheduled (agents, employees, or others) the ability to
15   enter bids for schedule patterns, e.g., using a Web
browser-based interface.   A process can then be run to
assign those entities to schedule patterns, based on those
bids and each agent's seniority, rank, a combination
thereof, or some other suitable metric.   In a variation,
20   supervisors may use the tool to see, modify and delete
schedule pattern bids.   The invention further allows a
supervisor to control exactly what parameters employees are
allowed to see.   For example, some supervisors may want
their employees to see lunch times, while others may not,
25   etc.   Supervisors preferably specify the fields that are
shown, possible exceptions that are shown, and the types of
schedules that employees may bid on (e.g., full time, part
time, overtime, schedules for certain skills, schedules for
certain teams, etc.)   In addition, preferably supervisors
30   can assign permissions to employees that determine which
type of schedules the employee can bid on.   This feature

allows multiple sets of schedules to be open for bidding at once, each with its own set of parameters. For example, a normal bid may be open at the same time as an overtime bid, or a holiday bid. This invention also preferably provides

5    an auto-rank feature that allows employees to sort the schedules in a desired order, enter rankings for specific schedules if they wish, and to automatically rank the remaining schedules in a current order.

In an illustrative embodiment, once a given schedule

10   pattern set is closed for bidding, the supervisor preferably initiates a process that assigns agents to schedule patterns based on their bids and on a ranking method selected by the supervisor. The supervisor can select the agents that are to be included in this

15   processing, and the supervisor may also indicate whether those agents' previous assignments are to be honored. The system preferably only assigns an agent to one schedule pattern during the assignment process, which preferably takes place as a batch operation. The supervisor can also

20   decide to force an assignment for each of the selected agents. Assignments may be forced if an agent did not enter any bids or if all of the schedule patterns for which the agent did enter bids have been assigned to other agents.

25   The invention may be extended to provide additional functionality. Thus, it may be desirable to allow employees to bid on a schedule that becomes available after another employee has changed schedules or left the company. For example, if an employee were to leave the company, then

30   his or her old schedule may be offered to employees in seniority order, or by some ranking, or according to who

had bid on that schedule during a last schedule bid, etc. Once an employee is assigned to the schedule, his or her old schedule would then become available for others to bid on, and so on. In another alternative, it may be desirable

5   to have the system implement the above-described bidding technique whereby the agents bid for individual days of a given week.

The present invention is also advantageous as it enables the work center management to provide evidence that

10  a particular agent received the best possible schedule available (given the agent's particular seniority or other ranking). Indeed, given the automated approach implemented in the present invention, the system can readily generate reports showing which agents got which schedules and that a

15  particular agent was assigned a given schedule only after those agents with higher seniority and/or ranking got the schedules they had requested. Such a reporting functionality also facilitates generating evidence to comply with union or other legal requirements.

20  The automated functionality of the present invention also enables schedule bidding to take place on a much more frequent basis as compared to prior art manual techniques. This enables a new set of schedules to be generated and made to closely match contact center demand curves on a

25  much more frequent and realistic basis.

In an illustrative embodiment, the agents are assigned to schedules using a computer-based agent scheduling program, such as TotalView, available from IEX, a Tekelec company. Any other computer-based program for scheduling

30  agents to a set of schedules according to given metrics (e.g., seniority, ranking, or the like) can be used.

It will be understood from the foregoing description that various modifications and changes may be made in the preferred embodiment of the present invention without departing from its true spirit.  This description is

5   intended for purposes of illustration only and should not be construed in a limiting sense.  The scope of this invention should be limited only by the language of the following claims.

Having described my invention, what I claim is as

10  follows: